

# THE RESULTS OF LAPAROTOMY FOR ACUTE INTESTINAL OBSTRUCTION.<sup>1</sup>

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When Madelung opened the discussion on the results of laparotomy for intestinal obstruction, in the last Congress of German Surgeons, he declined to consider the subject statistically, because he thought the figures could not lead to any valuable conclusions, and turned the discussion upon the proper methods of performing these operations. Although this opinion seems in the main correct, yet a statistical study of these results can at least be made to emphasize certain truths already known, even if it does not demonstrate any new facts.

In the lists of cases of laparotomy for intestinal obstruction which have been hitherto published, the acute and chronic forms have not been separated with sufficient care. In making the present collection, I have accepted only cases of acute obstruction, adhering to the definition given by Bryant (Harveian Lectures for 1884), including only those cases in which there was some strangulation of the gut—shown by the acute symptoms, the severe vomiting, and the early collapse; as distinguished from the milder, and more slowly developing symptoms which depend merely upon the obstruction to the onward movement of the contents of the intestine. It is unnecessary to dwell upon the great difference in the prognosis afforded by these two classes of cases.

I have also excluded all cases in which the symptoms developed after the reduction of a hernia, except those in which the diagnosis of hernia had not been made, or the obstruction was caused by some condition which could not be relieved by a simple modification of the ordinary herniotomy, or the cause

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of obstruction was altogether independent of the hernia. A few cases of stricture, and tumor of the intestine, in which the symptoms first made their appearance in the guise of an acute obstruction, have been included.

For the collection of these cases I am chiefly indebted to Mr. George H. Cobb, of New York, candidate in medicine.

The collection begins with the year 1873, when the principles of antiseptis may be said to have first come into general use, for Schramm has already shown that the mortality for these operations before that date was 73%, while from that year to 1883 it fell to 58%. (If we exclude all but the acute cases from Schramm's list, the percentage is found to be 75% before 1873, and 63% after that date).

TABLE I.

	Total.	Recovered.	Died.	Mortality Per cent
Intussusception.....	71	17	54	76.0
Volvulus.....	45	8	37	82.2
Adhesions.....	33	11	22	66.6
Bands and Diverticula.....	97	39	58	59.8
Internal Incarceration.....	28	11	17	60.7
Stricture.....	5	3	2	40.0
Tumors of the Bowel.....	15	4	11	73.3
Foreign Bodies.....	14	4	10	71.4
Miscellaneous.....	11	1	10	90.9
Undetermined.....	9	4	5	55.5
Totals.....	328	102	226	68.9

Table I. shows a total of 328 cases with 102 recoveries and 226 deaths, the percentage of mortality being 68.9—a higher percentage than that of Schramm's collection. This increase is probably due to the fact that, since laparotomy has become a recognized method for the treatment of intestinal obstruction, many more cases have been published than formerly when, by the influence of Nèlaton and his followers, it was kept under the ban of professional disapproval. But even

this great mortality doubtless falls short of the true death-rate, for many fatal cases are still suppressed, while nearly all the successful ones are published. As Treves remarks, there are few surgeons of large hospital experience, who have not met with two or three unsuccessful cases in their practice.

One of the principal causes of this high death-rate is the delay which takes place in putting the patient in charge of the surgeon. This delay is not to be measured merely by the lapse of time, but by the failure of the patient's strength, and that failure depends upon the severity of the symptoms, quite as much as upon their duration. Consequently an analysis of the mortality with reference to the duration of the symptoms, as in Table II., shows but little variation from day to day. The low mortality in the cases operated upon in the third week is

TABLE II.

<i>Duration of Symptoms.</i>	<i>CASES.</i>			<i>CONDITION OF THE FATAL CASES.</i>			<i>Mortality Per cent.</i>
	<i>Total.</i>	<i>Recovered.</i>	<i>Died.</i>	<i>Good.</i>	<i>Bad.</i>	<i>Undescribed.</i>	
1 day.	13	5	8	1	4	3	62
2 days.	18	5	13	1	5	7	72
3 days.	33	9	24	2	12	10	73
4 days.	34	9	25	2	4	9	73
5 days.	37	13	24	2	15	7	65
6 days.	41	11	30	5	15	10	73
7 days.	21	8	13	1	7	5	62
8-14 days.	63	13	50	5	30	15	79
15-21 days.	13	6	7	1	2	4	54
Several days.	28	9	19	1	3	15	68

to be taken merely as an indication that the form of obstruction for which the operation was performed was not very acute. The table also shows that the condition of the patient in the fatal cases varied but little, showing that when the symptoms were very acute the operation was performed early, and when subacute it was delayed until the patient was in the same state of collapse as resulted earlier in the acute cases. The rule in every case seems to have been to wait until there was little or no chance of recovery.

Let us look at the facts in regard to the cause of death in these cases, as shown in Table III. Under the heading "various complications" are included phthisis (1 case), pneumonia (4 cases), abortion (1 case), perforation of typhoid or tuberculous ulcer of the bowel (2 cases), abscess bursting into the peritoneal cavity at the time of operation (2 cases), diarrhœa subsequent to the operation (1 case), and paralysis of the gut persisting after the removal of the cause of obstruction (2 cases). By "sepsis" is meant septicæmia, pyæmia, or peritonitis, developing after the operation, and not due to gangrene of the bowel—the latter cases being included under the title "gangrene of the gut."

TABLE III.

<i>Cause of Death.</i>	<i>Total.</i>	<i>Intussuscep.</i>	<i>Fistula</i>	<i>Perforat.</i>	<i>Abortion.</i>	<i>Band, etc.</i>	<i>Int. incarc.</i>	<i>Stricture.</i>	<i>Neoplasm</i>	<i>Foreign bodies.</i>	<i>Miscellaneous.</i>	<i>Undetermined.</i>
Condition, very poor.....	42	13	8	3	8	2			4	1	2	1
Collapse.....	51	13	11	4	16	3	1	1	1			1
Moribund.....	8-101	2	1	4					1			
Complications, Peritonitis.....	12	2	2	1	5	1				1		
Gangrene of gut.....	16	5	1	2	5	2					1	
Various.....	13-41	2	2	3	4	1						1
Cause of obstruction not found.....	19		5	3	3	1				1	4	2
Cause of obstruction irremediable.....	9-28	3	3					1		1	1	
Prolonged operation.....	3			1	2							
Shock.....	13	5	2	1	3	1					1	
Sepsis not due to gangrene.....	17	6		2	3	2			2	2		
Undetermined.....	12-45	3	1		2	1			1	3	1	
Details wanting.....	11		2	1	3	3			2			
Totals.....	226	54	37	22	58	17	2	11	10	10	5	

In 101 cases, the failure of the operation was due directly to the poor condition of the patient, who was actually moribund in 8 cases. In the majority of the cases with complications, 41 in all, the fatal result was also really due to the condition of the patient, for the existence of peritonitis or gangrene of the gut at the time of operation shows that there had been too

much delay in resorting to operative interference. The majority of these cases, however, died within a few hours of the operation, and if the reports had been fully given, probably nearly all of them could be included among the cases in very poor condition. It must be noted, however, that in two cases the peritonitis found at operation was due to perforation of the gut, caused by attempts to remove the obstruction by large injections.

In 28 cases the cause of obstruction was not found, or could not be removed, and in 11 the reports are too deficient in detail to allow us to form any opinion as to the cause of death.

Deducting the foregoing cases from the gross mortality, as they throw no light upon the dangers of the operation itself when performed under reasonably favorable conditions, there are only 45 cases remaining. Of these 45 cases, 13 died of shock (being in fair condition at the time of operation); in 3 cases the unusual length of the operation may be assumed to have been the cause of death; and in 17 cases, sepsis, probably due to the operation, was the cause of death. In 12 cases the cause could not be definitely ascertained, but as the majority died within 24 hours after the operation, it was probably shock and exhaustion.

These figures are too small for sound deductions, but they indicate that the causes of death, when the patient is not in a bad condition, are sepsis and shock, in an equal number of cases, and emphasize the necessity for an antiseptic and brief operation.

The necessity for making the operation as short as possible cannot be too strongly emphasized, and Table IV has been arranged to show the results of the various methods of treatment adopted by the surgeon, or forced upon him by the exigencies of the case, with especial reference to this factor.

It becomes at once apparent that the most essential requirement for success in these cases is the removal of the cause of obstruction, for in 247 cases in which this was accomplished, the mortality was only 62.7%; while in 74 in which it was not done, the mortality was 86.4%. Indeed, in the cases of obstruction by intussusception, volvulus, adhesions, bands and internal incarceration, in which the obstruction was not re-

TABLE IV.

TREATMENT.	ALL VARIETIES.				INTUSSUS., VOLVULUS, ADHESIONS, BANDS, INTERNAL INCARCERAT.	
	Recov.	Died.	Total	Mortality Per Cent.	Cases.	Mortality Per cent.
Obstruction removed, simply.	81	105	186	56.4	183	56.8
" " artif. anus.	5	10	15	66.6	12	75.0
" " resect. & suture	6	39	45	86.6	30	86.6
" " gangrene. gut left.	0	1	1	100.	1	100.
" " total.	— 92	— 155	— 247	62.7	— 226	61.9
" not removed, artif. anus.	9	24	33	72.7	16	100.
" " " nothing done.	1	40	41	97.5	25	100
" " " total.	— 10	— 64	— 74	86.4	— 41	100.
Details wanting.	— 0	— 7	— 7		— 7	
Grand Total.	— 102	— 276	— 328	68.9	— 274	68.6

moved, 41 in number, not a single one recovered, although in 16 an artificial anus was made.

When the operative interference was limited to finding and removing the obstruction, without wounding the bowel, the mortality was only 56.4 %, calculated on 186 cases; when it was necessary to establish an artificial anus after the obstruction had been relieved (owing to gangrene or rupture of the gut) the mortality rose to 66.6 %, in 15 cases; and, finally, when an attempt was made to suture the wound in the intestine, whether it involved the entire circumference or not, the mortality reached the extreme point of 86.6% in 45 cases. Only 10 % of the deaths in the last two classes of cases were from sepsis due to the operation. and not more than the usual number (50 %) were due to the condition of the patient, while 23 % were due to the duration of the operation and to shock.<sup>1</sup>

<sup>1</sup>A study of the causes of death in the last two classes of cases, 49 deaths in 60 cases, shows that death was due to the bad condition of the patient in 24 (50 %); peritonitis and gangrene at the time of operation in 2; other complications in 3; prolonged operation in 3; shock in 9; sepsis in 5; unknown in 3.

These figures present an additional plea for making the operation as short as possible, and especially for refraining from any attempt at an elaborate suturing of the intestine.

An interesting result is obtained by a separate classification of all the cases in the list in which the operator has had three cases or more. Thus, 17 operators performed 87 operations, with a mortality of 67.9 %, which is remarkably near the mortality calculated upon all the cases in the table.

The rival of laparotomy in the treatment of acute obstruction is enterotomy, or more properly enterostomy—the creation of an artificial anus, without attempting to find and remove the cause of obstruction. Enterostomy is merely a palliative operation, relieving the pressure of the intestinal contents behind the obstructed point, and not removing the cause of obstruction, except so far as it may be effected by relieving that pressure. That a complete cure can be brought about in some cases by enterostomy is proven by a few recorded cases in which the feces resumed their natural passage soon after the operation, although nothing else had been done to remove the cause of obstruction. But these cases are very rare—how rare is evident from the figures just given, showing that of 16 cases in which the obstruction was caused by intussusception, volvulus, adhesions, bands, or internal incarceration, in which laparotomy was performed and the obstruction was not removed but an artificial anus established, not a single case recovered.

The only accessible figures in regard to enterostomy performed for intestinal obstruction, are those of Treves, giving a mortality of 41 out of 61 cases—67.2 %. This is very little better than the death rate of laparotomy just ascertained, 68.4 %. It must be acknowledged that some improvement may be shown by more recent statistics, but that improvement must be very great before the surgeon can adopt enterostomy with such small chances of cure, in preference to laparotomy, which at a slightly greater risk, offers every opportunity for the exact diagnosis and complete removal of the offending cause.

In conclusion, we may repeat that the analysis just made shows a very high rate of mortality for laparotomy in these

cases, but that this high rate of mortality is due chiefly to the bad condition of the patient at the time, the operation having been too long delayed, and that it will not be difficult in the future to reduce the mortality by avoiding this error, and by making the operation as brief as possible. By operating earlier, we shall not only have the patient in better condition, but we shall avoid the dangers of peritonitis and gangrene of the gut, and the difficulties caused by excessive tympanites. A short, simple operation gives almost the only hope of success, and the earlier the operation is performed, the shorter and simpler it may be made.

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## THE HISTORY OF ABDOMINAL SECTION IN ALBANY, WITH A REPORT OF SEVENTY- FIVE CASES.

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**B**ELIEVING that the time has come when every case of abdominal section should be reported, I have endeavored to give in this paper an accurate report of the work done in Albany. While I could wish that this history presented better results, I am convinced that it fairly represents the early struggles of this branch of surgery in this country.

Though the mortality was great during the first years of our work in this line, I am satisfied that, by an honest presentation of facts, we can convince our patients and their friends that we have reached such a degree of success as to be able to offer them every encouragement to have an early operation. I believe it to be the duty of every operator to collect from his own medical territory every case favorable or not, and give it to the world, and I venture to predict that the statistics so collected will demonstrate the fact that there must, and will be surgical centres for doing this branch of surgery. Undoubt-